Bloomenergy

January 26, 2017

Justin Adams
Bloom Energy Corporation
1299 Orleans Drive
Sunnyvale, CA 94089

RE: **PETITION NO. 1278 -** Bloom Energy Corporation, as an agent for Medtronic Inc., petition for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, operation and maintenance of a Customer-Side 200-Kilowatt Fuel Cell Facility to be located at 20 Middletown Avenue and a Customer-Side 300 Kilowatt Fuel Cell Facility to be located at 195 McDermott Road, both located at the Medtronic campus in North Haven, Connecticut.

Dear Ms. Bachman,

We are submitting an original and fifteen (15) copies of the interrogatories response for Petition NO. 1278.

Sincerely,

Justin Adams
justin.adams@bloomenergy.com
(860) 839-8373

Petition No. 1278
Bloom Energy Corporation Medtronic Inc.,
North Haven, CT
Interrogatories

1. Bloom provided notice to the abutting property owners, state agencies, and state and local public officials via US mail. Bloom has subsequently provided notice via certified mail, the letter is attached as an amendment to Exhibit 9. The receipts have been emailed to the Council to reduce the paper usage required to provide 16 copies.

2. The operational life is for the life of the 20 year contract. The solid oxide media in the fuel cells are exchanged at roughly 5 year intervals.

3. Bloom used a sound model to predict the noise output of 52 dBA at the closest property boundary located approximately 73 feet to the west. This is a property boundary with McDermott Road, which was selected because it is the closest to either proposed installations and would therefore have the highest predicted noise levels. Since there are no receptors located at this location, Bloom has rerun the model for the closest receptor. The closest off-campus receptor is a Class B[1] receptor located approximately 280 feet to the west of the proposed Office installation. For comparison, Bloom has also run the model for the closest receptor to the proposed Manufacturing installation. The closest off-campus receptor would be a Class B receptor located approximately 850 feet to the northeast. The results of the three sound model runs at the specified distances are provided as Exhibit 10. The proposed Energy Servers would be defined as "Scenario 2" in the model. Scenario 2 models noise for a Bloom Energy Server installed with no structures behind it to reflect sound from either side. The results of the Scenario 2 sound model at 73, 280 and 850 feet are 51.5, 39.8 and 30.1 dBA. The values are in compliance with noise criteria set forth in Connecticut regulations for the Control of Noise[2] and the Town of North Haven Code of Ordinances[3].

4. The distance to the nearest residence from the Office installation would be approximately 690 feet to the southeast of the proposed location. The distance to the nearest residence from the Manufacturing installation would be approximately 0.25 miles to the southeast of the proposed location.

5. The Energy Servers have redundant safety features and in-system checks to ensure personnel safety. While the actual fuel cells operate at high temperatures, these components do not move and are contained within many layers of insulation. It is safe to stand adjacent to the equipment as all moving parts and hot surfaces are protected by the locked outer panels. The parking area around the proposed Office installation is monitored

[1] Sec. 22a-69-2.3. Noise zone standards
[2] Sec. 22a-69-3.5. Noise zone standards
[3] Chapter 146: Noise.

by security cameras mounted to the light poles. The Manufacturing installation would be within the fenced Medtronic campus that is controlled by a security gate located on Middletown Avenue and monitored by security cameras. Additionally, the Medtronic campus is located within an industrial area with little pedestrian traffic. Therefore, Bloom does not have safety or security concerns associated with this proposed location.

6. According to CTDEEP data, inland wetland soils ("Poorly Drained and/or Very Poorly Drained Soils") are located approximately 1,000 feet to the west of both the Manufacturing and Office installation location. There are no watercourses or waterbodies less than 1,000 feet from the locations. See Exhibit 11.

7. No, according to CTDEEP GIS data, the nearest Aquifer Protection Area is located approximately 5.25-miles to the north-northwest of the proposed locations.

8. The proposed facility will displace less efficient fossil fueled marginal generation on the NE ISO system. Based upon US EPA "eGrid" data the proposed facility is expected to reduce carbon emissions by more than 25% while essentially eliminating local air pollutants like NOx, SOx, and particulate matter.

9. Exhibit 5 has been revised to include the datasheets for the 200kW and 300kW models. Please refer to the datasheets, as it provides a range of emissions specific to the type of fuel cell for the proposed locations. Bloom has revised Table 1 to match the information provided in the datasheets.

Revised Table 1

Compound	Connecticut Emission Standard (lbs/MW-hr)[4]	Bloom Energy Server (lbs/MW-hr)
Oxides of Nitrogen (NO_x)	0.15	<0.01
Carbon Monoxide (CO)	1	<0.05
Carbon Dioxide (CO_2)	1,650	679-833

10. No gaseous substances are released or vented at any point during the desulfurization process.

11. The options at the conclusion of the 20 year contract between Bloom and Medtronic includes;

    i. Medtronic renews the contract,
    ii. Medtronic returns the Energy Servers at no cost, or

[4] Conn. Agencies Regs. § 22a-174-42, Table 42-2.

iii. Medtronic buys the Energy Servers at a fair market value.

If the Energy Servers are to be removed at the end of the contract or if there is a default in the contract;

i. the Energy Servers, associated equipment and components will be dismantled and removed,
ii. the concrete pads will remain unless requested to be removed, and
iii. the site will be restored as nearly as practicable to its effective original condition.

12. No, the proposed Energy Server is UL Listed as a “Stationary Fuel Cell Power System” to ANSI/CSA FC 1-2014. It is UL Listed under UL Category IRGZ and UL File Number MH45102.

13. Bloom spoke by telephone and provided a copy of the site plan via email to Alan Fredrickson, Land Use Administrator for the Town of North Haven on November 28, 2016. There were no concerns expressed during or as a follow-up to these communications.

14. There are no retaining walls proposed for this site.

15. There are no old field areas or deciduous forests within either of the fuel cell construction areas. The fuel cells will be placed in areas that have been previously disturbed and developed, therefore no land clearing is proposed.

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Revised Exhibit 9

Bloomenergy

VIA FIRST CLASS MAIL

12/19/2016

RE: Application for Bloom Energy, as Agent for Medtronic Inc., for the construction of a new ES-5 Bloom Energy Servers solid oxide fuel cell which would provide 500 kilowatts of Customer-Side Distributed Resource at – 195 McDermott Road and 20 Middletown Avenue, North Haven, CT

Dear Ladies and Gentlemen:

Pursuant to Section §16-50j-40 of the Connecticut Siting Council's (the "Council") regulations, we are notifying you that Medtronic Inc. has filed on December 12, 2016, a petition for declaratory ruling with the Council. The petition requests the Council's approval of the location and construction of two (2) Bloom Energy Corporation fuel cells and associated equipment totaling approximately 500 kilowatts (kW). The 300 kW and 200 kW fuel cells would be located at 195 McDermott Road and 20 Middletown Avenue respectively. The buildings are adjacent to one another and located on the Medtronic campus in North Haven, Connecticut. Electricity generated by the Facility will be consumed primarily at the Site, and any excess electricity will be exported to the electric grid. The Facility will be fueled by natural gas.

The purpose of the proposed Facility is to replace the average baseload of the buildings with a renewable energy source[i] and improve reliability of electrical systems and equipment.

Keeping the lines of communication open is an important part of our work in your community. If you have questions about this work, please contact the undersigned or the Council.

Respectfully,

Justin Adams
justin.adams@bloomenergy.com

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[i] Connecticut Geneneral Statutes §16-1(a)(26)(A) identifies fuel cells as a "Class I renewable energy source"

Exhibit 10

Calculation of **Yuma** Sound Pressure Based On Distance

By Bob Hintz 1/16

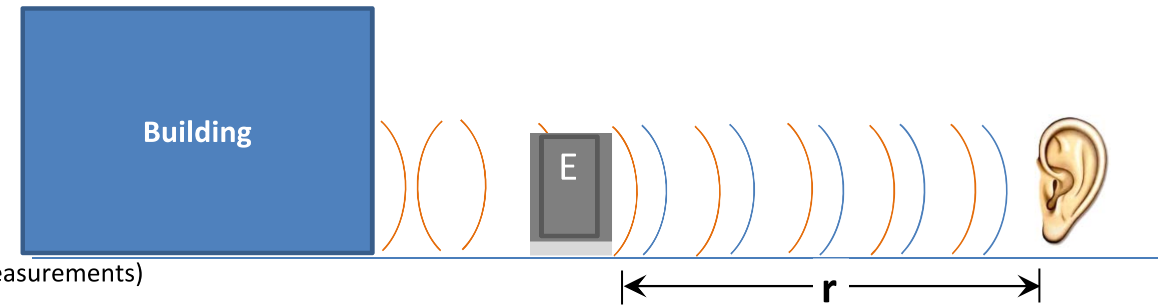
All calculations are based on the following formula for sound pressure level (L_p):

$$L_p = L_W - \left| 10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right) \right|$$

Sound power value (L_W) attained from V1 Yuma linear in DE reported on Feb. 4, 2015 by Mei Wu.

Scenario 1

ES is installed close to a building or tall wall so noise from the ES is reflected off of the structure and added to the noise from the other side of the ES making it sound louder than normal. This is represented by a directivity factor Q = 4



L_p =	**54.5** dB	

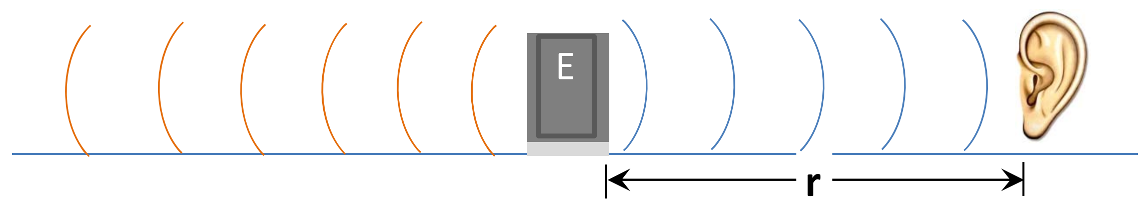
Where:

L_W =	86.4 dB	ES sound power (Calc. from measurements)
Q =	4	Directivity factor
r =	73 Feet	**Enter value here for both Scenarios**

Input verious values for r to approximate the percieved sound pressure at that distance from the ES door

Scenario 2

ES is installed with no structures behind it to reflect sound from either side. This is represented by a directivity factor Q = 2



L_p =	**51.5** dB	

Where:

L_W =	86.4 dB	ES sound power (Calc.)
Q =	2	Directivity factor
r =	73 Feet	

Input verious values for r to approximate the percieved sound pressure at that distance from the ES door

Calculation of **Yuma** Sound Pressure Based On Distance

By Bob Hintz 1/16

All calculations are based on the following formula for sound pressure level (L_p):

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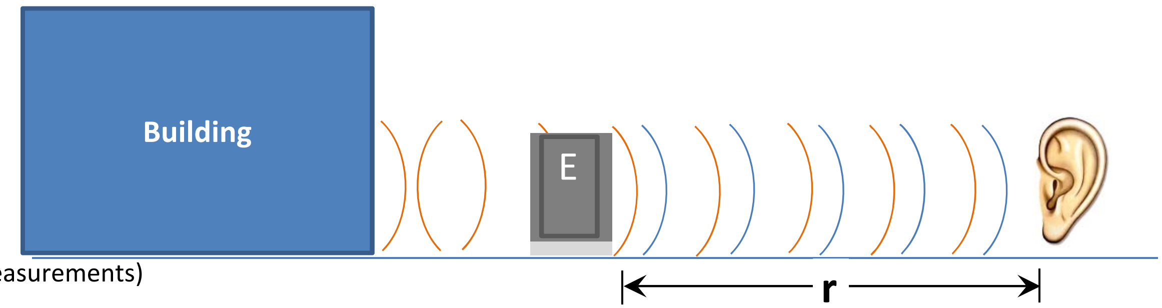


L_p = 42.8 dB

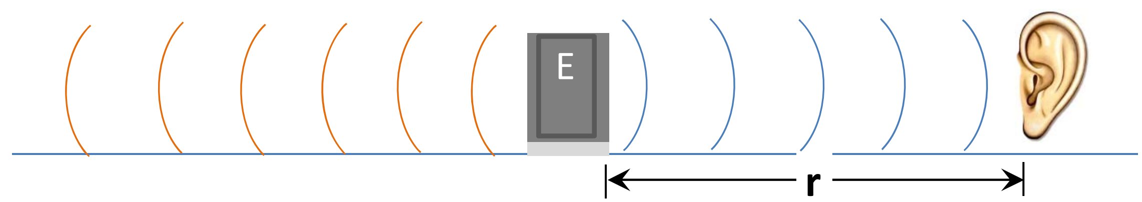
Where:

L_W =	86.4 dB	ES sound power (Calc. from measurements)
Q =	4	Directivity factor
r =	280 Feet	**Enter value here for both Scenarios**

Input verious values for r to approximate the percieved sound pressure at that distance from the ES door

Scenario 2

ES is installed with no structures behind it to reflect sound from either side. This is represented by a directivity factor Q = 2



L_p = 39.8 dB

Where:

L_W =	86.4 dB	ES sound power (Calc.)
Q =	2	Directivity factor
r =	280 Feet	

Input verious values for r to approximate the percieved sound pressure at that distance from the ES door

Calculation of **Yuma** Sound Pressure Based On Distance

By Bob Hintz 1/16

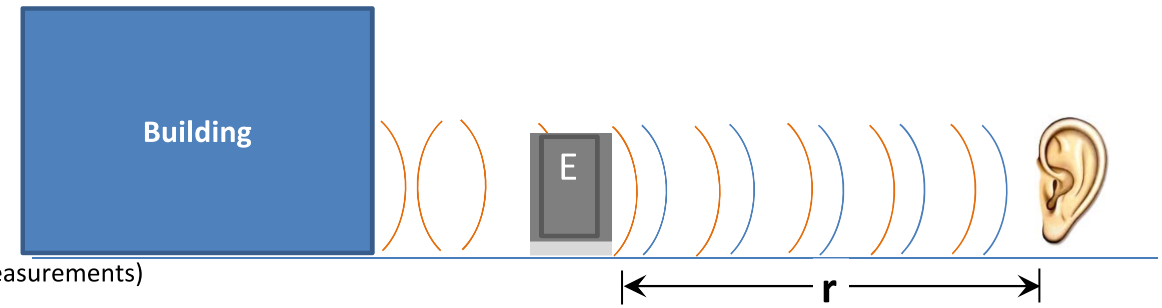
All calculations are based on the following formula for sound pressure level (L_p):

$$L_p = L_W - \left| 10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right) \right|$$

Sound power value (L_W) attained from V1 Yuma linear in DE reported on Feb. 4, 2015 by Mei Wu.

Scenario 1

ES is installed close to a building or tall wall so noise from the ES is reflected off of the structure and added to the noise from the other side of the ES making it sound louder than normal. This is represented by a directivity factor Q = 4



L_P =	**33.2** dB	

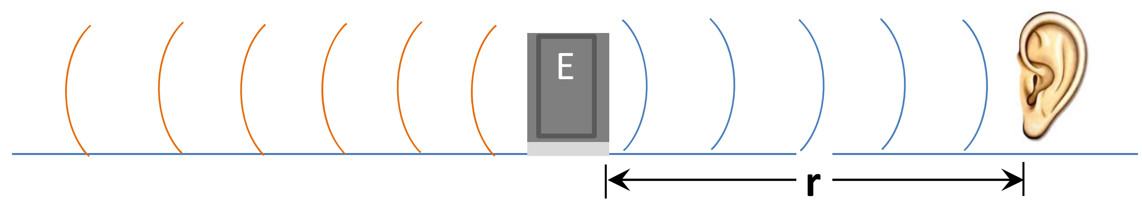
Where:

L_W =	86.4 dB		ES sound power (Calc. from measurements)
Q =	4		Directivity factor
r =	850	Feet	**Enter value here for both Scenarios**

Input verious values for r to approximate the percieved sound pressure at that distance from the ES door

Scenario 2

ES is installed with no structures behind it to reflect sound from either side. This is represented by a directivity factor Q = 2



L_P =	**30.1** dB	

Where:

L_W =	86.4 dB		ES sound power (Calc.)
Q =	2		Directivity factor
r =	850	Feet	

Input verious values for r to approximate the percieved sound pressure at that distance from the ES door

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Exhibit 11

Map

Inland Wetland Soils

- Poorly Drained and Very Poorly Drained Soils
- Alluvial and Floodplain Soils

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Revised Exhibit 5

Bloomenergy®

Energy Server 5

Clean, Reliable, Affordable Energy

CLEAN, RELIABLE POWER ON DEMAND

Bloom Energy's Energy Server 5 delivers clean power that reduces emissions and energy costs. The modular architecture enables the installation to be tailored to the actual electricity demand, with a flexibility to add servers as the load increases. The Energy Server 5 actively communicates with Bloom Energy's network operations centers so system performance can be monitored and maintained 24 hours per day, 365 days per year.

INNOVATIVE TECHNOLOGY

Utilizing patented solid oxide fuel cell (SOFC) technology, the Energy Server 5 produces combustion-free power at unprecedented efficiencies, meaning it consumes less fuel and produces less CO_2 than competing technologies. Additionally, no water is needed under normal operating conditions.

ALL-ELECTRIC POWER

The Energy Server 5, which operates at a very high electrical efficiency, eliminates the need for complicated and costly CHP systems. Combining the standard electrical and fuel connections along with compact footprint and sleek design, the Energy Server 5 is the most deployable fuel cell on the market.

CONTROLLED AND PREDICTABLE COST

By providing efficient on-site power generation, the economic and environmental benefits are central to the Energy Server 5 value proposition. Bloom Energy customers can lock in their long term energy costs and mitigate the risk of electricity rate increases. The Energy Server 5 has been designed in compliance with a variety of safety standards and is backed by a comprehensive warranty.

About Bloom Energy

Bloom Energy is making clean, reliable energy affordable. Our unique on-site power generation systems utilize an innovative fuel cell technology with roots in NASA's Mars program. By leveraging breakthrough advances in materials science, Bloom Energy systems are among the most efficient energy generators, providing for significantly reduced operating costs and dramatically lower greenhouse gas emissions. Bloom Energy Servers are currently producing power for many Fortune 500 companies including Apple, Google, Walmart, AT&T, eBay, Staples, as well as notable non-profit organizations such as Caltech and Kaiser Permanente.

Headquarters:
Sunnyvale, California

For More Information:
www.bloomenergy.com

Energy Server 5

Technical Highlights (ES5-BA2AA0)

Outputs	
Nameplate power output (net AC)	210 kW
Base load output (net AC)	200 kW
Electrical connection	480 V, 3-phase, 60 Hz
Inputs	
Fuels	Natural gas, directed biogas
Input fuel pressure	10-18 psig (15 psig nominal)
Water	None during normal operation
Efficiency	
Cumulative electrical efficiency (LHV net AC)*	65-53%
Heat rate (HHV)	5,811-7,127 Btu/kWh
Emissions	
NOx	< 0.01 lbs/MWh
SOx	Negligible
CO	< 0.05 lbs/MWh
VOCs	< 0.02 lbs/MWh
CO_2 @ stated efficiency	679-833 lbs/MWh on natural gas; carbon neutral on directed biogas
Physical Attributes and Environment	
Weight	13.6 tons
Dimensions (variable layouts)	14'9" x 8'8" x 7'0" or 29'4" x 4'5" x 7'5"
Temperature range	-20° to 45° C
Humidity	0% - 100%
Seismic vibration	IBC site class D
Location	Outdoor
Noise	< 70 dBA @ 6 feet
Codes and Standards	
Complies with Rule 21 interconnection and IEEE1547 standards	
Exempt from CA Air District permitting; meets stringent CARB 2007 emissions standards	
An Energy Server is a Stationary Fuel Cell Power System. It is Listed by Underwriters Laboratories, Inc. (UL) as a 'Stationary Fuel Cell Power System' to ANSI/CSA FC1-2014 under UL Category IRGZ and UL File Number MH45102.	
Additional Notes	
Access to a secure website to monitor system performance & environmental benefits	
Remotely managed and monitored by Bloom Energy	
Capable of emergency stop based on input from the site	

* 65% LHV efficiency verified by ASME PTC 50 Fuel Cell Power Systems Performance Test

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Headquarters:
Sunnyvale, California

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www.bloomenergy.com

Energy Server 5

Technical Highlights (ES5-YA8AA0)	
Outputs	
Nameplate power output (net AC)	300 kW
Base load output (net AC)	300 kW
Electrical connection	480 V, 3-phase, 60 Hz
Inputs	
Fuels	Natural gas, directed biogas
Input fuel pressure	10-18 psig (15 psig nominal)
Water	None during normal operation
Efficiency	
Cumulative electrical efficiency (LHV net AC)*	65-53%
Heat rate (HHV)	5,811-7,127 Btu/kWh
Emissions	
NOx	< 0.01 lbs/MWh
SOx	Negligible
CO	< 0.05 lbs/MWh
VOCs	< 0.02 lbs/MWh
CO_2 @ stated efficiency	679-833 lbs/MWh on natural gas; carbon neutral on directed biogas
Physical Attributes and Environment	
Weight	15.3 tons
Dimensions (variable layouts)	18' 4" x 8' 8" x 7' 0" or 32' 11" x 4' 5" x 7' 5"
Temperature range	-20° to 45° C
Humidity	0% - 100%
Seismic vibration	IBC site class D
Location	Outdoor
Noise	< 70 dBA @ 6 feet
Codes and Standards	
Complies with Rule 21 interconnection and IEEE1547 standards	
Exempt from CA Air District permitting; meets stringent CARB 2007 emissions standards	
An Energy Server is a Stationary Fuel Cell Power System. It is Listed by Underwriters Laboratories, Inc. (UL) as a ‘Stationary Fuel Cell Power System’ to ANSI/CSA FC1-2014 under UL Category IRGZ and UL File Number MH45102.	
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